

國立清華大學 學習科學與科技所
新素養、內容分析與文本探勘

Fall 2023, 3 credits (中文授課)

Time: Tuesday, 2, 3, 4 Location: Room 409, General Building

授課老師: 陳素燕教授 (suychen@mx.nthu.edu.tw)

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數位學習: eLearn 平台

課程說明

日新月異的科技正在重新定義 21 世紀的讀寫素養/資訊理解與表達能力。

在課程內容上, 本課程第一個單元「新素養」透過三個子題(1)線上閱讀重要性的爭論(debate)、(2)多文本識讀(multiple document literacy)與批判素養(critical literacy)、和(3)多模態素養(multimodal literacies)與多重素養(Multiliteracies)於教育, 來進行開展: 從傳統課堂的閱讀教育到數位閱讀, 從單文本閱讀理解到多文本資訊識讀, 從文字為主體的讀寫素養到多模態素養, 從基本技能到銜接個人/公民/生涯發展的多重素養, 再到最新科技 ChatGPT 等生成式 AI 作為前沿新素養的想像。

本課程第二單元「內容分析與文字探勘」, 以上述新素養觀念為依據, 探討如何藉由不同的研究取向和新近工具來理解和應用資訊世代的海量資料, 特別是文字和圖像資料兩大面向: (一)在文字為本的內容分析與探勘, 將介紹 LDA, sentiment analysis, data mining (涵蓋的則有高教任務、COVID-19 和其他多元主題), 及以 ChatGPT 為標註工具的文本探勘嚐試(以健康領域的假訊息為主題)等。(二)在圖像和圖文跨模態上, 將介紹(1)圖像分析(以審美和所引發的情感類型為主題), 和延伸出(2)大型語言模型(Large Language Models, 例如 ChatGPT)和圖像生成模型(例如 Midjourney, Stable Diffusion)的 text2text & text2image 綜合應用。

本課程兩個層次的教學目標為: (1)通過文獻討論, 構建對新素養、內容分析與文本探勘等學術論文的基本理解。(2)安排實做範例, 邀請有實務經驗的研究者與學生專家來進行交流。在課程規劃上, 約有 3/4 的週次是簡報分享與討論(paper presentation and leading discussion), 1/4 的週次是實做交流(invited talk, workshops, final project presentation)。在學習期待上, 每位同學需進行三篇論文簡報與討論帶領, 在論文的挑選上, 此版本課綱所羅列的論文選單只是提供修課同學參考, 非常歡迎同學在選單外提供自選論文。Final project 則形式多元, 可以從事文本內容分析(人為標註、文本探勘、ChatGPT 標註..., 資料集可以自己蒐集, 或者使用老師的 COVID-19 news media data), 圖像內容分析, 或者文生圖作品集及理念說明等。

本課程鼓勵學生利用 AI 進行協作或互學, 以提升本門課產出品質。根據清華大學公布之「大學教育場域 AI 協作、共學與素養培養指引」, 本門課程採取有條件開放, 以下說明如何使用生成式 AI 於課程產出: 學生須於課堂作業或報告中的「標題頁

註腳」或「引用文獻後」簡要說明如何使用生成式 AI 進行議題發想、文句潤飾或結構參考等使用方式。相對地，本門課授課教材或學習資料若有引用自生成式 AI，教師也將在投影片或口頭標注。

課程主題

		Topic
1	9/12	課程介紹
2	9/19	新素養、內容分析與文本探勘
3	9/26	新素養(1): Reading in the digital age
4	10/3	新素養(2): Multiple document literacy & critical literacy
6	10/17	新素養(3): Multimodal literacies, multiliteracies and education
7	10/24	新素養(4): Multimodal literacies, multiliteracies and education
8	10/31	內容分析與文字探勘(1): Text analysis on higher education
9	11/7	內容分析與文字探勘(2): Text analysis (實作範例)
10	11/14	內容分析與文字探勘(3): Image analysis on visual art
11	11/21	內容分析與文字探勘(4): Image analysis on aesthetic emotions
12	11/28	內容分析與文字探勘(5): text2image- using ChatGPT and Midjourney (實作範例)
13	12/5	內容分析與文字探勘(6): text2image- using ChatGPT and Stable Diffusion (實作範例)
14	12/12	內容分析與文字探勘(7): text mining- LDA for topic modeling
15	12/19	內容分析與文字探勘(8): text mining- Sentiment analysis
16	12/26	Final Project Presentation

週次進度及論文選單

Week 2 (9/19)

Introduction on New literacies, content analysis and text mining

Week 3 (9/26)

新素養(1): Reading in the digital age

1. Coiro, J. (2021). Toward a multifaceted heuristic of digital reading to inform assessment, research, practice, and policy. *Reading Research Quarterly*, 56(1), 9-31.
2. Hillesund, T., Schilhab, T., & Mangen, A. (2022). Text materialities, affordances, and the embodied turn in the study of reading. *Frontiers in Psychology*, 13.
3. van der Weel, A., & Mangen, A. (2022). Textual reading in digitised classrooms: Reflections on reading beyond the internet. *International Journal of Educational Research*, 115, 102036.
4. Vasinda, S., & Pilgrim, J. (2022). Technology supports in the UDL framework: Removable scaffolds or permanent new literacies? *Reading Research Quarterly*, 58(1), 44-58.

Week 4 (10/3)

新素養(2): Multiple document literacy & critical literacy

5. Alexander, P. A. (2020). What research has revealed about readers' struggles with comprehension in the digital age: Moving beyond the phonics versus whole language debate. *Reading Research Quarterly*, 55, S89-S97.
6. Anmarkrud, Ø., Bråten, I., & Strømsø, H. I. (2014). Multiple-documents literacy Strategic processing, source awareness, and argumentation when reading multiple conflicting document. *Learning and Individual Differences*, 30, 64-76
7. List, A., & Alexander, P. A. (2017). Text navigation in multiple source use. *Computers in Human Behavior*, 75, 364-375.
8. List, A., & Alexander, P. A. (2019) Toward an Integrated Framework of Multiple Text Use. *Educational Psychologist*, 54:1, 20-39.
9. Oliveras, B., Márquez, C., & Sanmartí, N. (2014). Students' attitudes to information in the press: Critical reading of a newspaper article with scientific content. *Research in Science Education*, 44(4), 603-626.

Week 6 (10/17)

新素養(3): Multimodal literacies, multiliteracies and education

10. Campbell, T. & Parr, M. (2013). Mapping today's literacy landscapes: Navigational tools and practices for the journey. *Journal of Adolescent & Adult Literacy*, 57(2), 131-140.
11. Niemi, H., Harju, V., Vivitsou, M., Viitanen, K., Multisilta, J., & Kuokkanen, A. (2014). Digital storytelling for 21st century skills in virtual learning environment. *Creative Education*, 5, 657-671.
12. Howell, E., Perez, S., & Abraham, W. T. (2021). Toward a professional development model for writing as a digital, participatory process. *Reading Research Quarterly*, 56(1), 95-117.

Week 7 (10/24)

新素養(4): Multimodal literacies, multiliteracies and education

13. Dahlström, H. (2022). Students as digital multimodal text designers: A study of resources, affordances, and experiences. *British Journal of Educational Technology*, 53(2), 391-407.
14. Lammers, J. C., Magnifico, A. M., & Wang, A. (2022). Playful Multiliteracies: Fan-Based Literacies' Role in English Language Arts Pedagogy. *Journal of Adolescent & Adult Literacy*, 66(2), 80-90.
15. Kohnke, L., Moorhouse, B. L., & Zou, D. (2023). ChatGPT for Language Teaching and

Learning. *RELC Journal*, 00336882231162868.

16. Kasneci, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... & Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274.

Week 8 (10/31)

內容分析與文字探勘(1): Text analysis on higher education

17. Bayrak, T. (2020). A content analysis of top-ranked universities' mission statements from five global regions. *International Journal of Educational Development*, 72, 102-130.
18. Cortés Sánchez, J. D. (2018). Mission statements of universities worldwide: Text mining and visualization. *Intangible Capital*, 14(4), 584-603.
19. Figueira, Á. (2018). A Three-Step Data-Mining Analysis of Top-Ranked Higher Education Institutions' Communication on Facebook. In *Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality* (pp. 923-929).

Week 9 (11/7)

內容分析與文字探勘(2): Text analysis (實作範例)

Invited talk (郭欣妤 NTHU PhD student, college of education)

Week 10 (11/14)

內容分析與文字探勘(3): Image analysis on visual art

20. Cetinic, E., & She, J. (2022). Understanding and creating art with AI: review and outlook. *ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM)*, 18(2), 1-22.
21. Cetinic, E., Lipic, T., & Grgic, S. (2019). A Deep Learning Perspective on Beauty, Sentiment, and Remembrance of Art. *IEEE Access*, 7, 73694-73710
22. Zhang, J., Miao, Y., & Yu, J. (2021). A comprehensive survey on computational aesthetic evaluation of visual art images: *Metrics and challenges*. *IEEE Access*, 9, 77164-77187.

Week 11 (11/21)

內容分析與文字探勘(4): Image analysis on aesthetic emotions

23. Mohammad, S. M., and Kiritchenko, S. (2018). WikiArt Emotions: An Annotated Dataset of Emotions Evoked by Art. In *Proceedings of the 11th Edition of the Language Resources and Evaluation Conference (LREC-2018)*, May 2018, Miyazaki, Japan
24. Achlioptas, P., Ovsjanikov, M., Haydarov, K., Elhoseiny, M., and Guibas, L. (2021).

Artemis: Affective language for visual art. *arXiv preprint arXiv:2101.07396*.

25. Schindler, I., Hosoya, G., Menninghaus, W., Beermann, U., Wagner, V., Eid, M., & Scherer, K. R. (2017). Measuring aesthetic emotions: A review of the literature and a new assessment tool. *PloS one*, *12*(6), e0178899.

Week 12 (11/28)

內容分析與文字探勘(5): text2image- using ChatGPT and Midjourney (實作範例)

26. White, J., Fu, Q., Hays, S., Sandborn, M., Olea, C., Gilbert, H., ... & Schmidt, D. C. (2023). A Prompt Pattern Catalog to Enhance Prompt Engineering with ChatGPT. *arXiv preprint arXiv:2302.11382*.

Workshop I (蔡秉叡 陽交大電物三)

Week 13 (12/5)

內容分析與文字探勘(6): text2image- using ChatGPT and Stable Diffusion (實作範例)

27. Dehouche, N., & Dehouche, K. (2023). What is in a Text-to-Image Prompt: The Potential of Stable Diffusion in Visual Arts Education. *arXiv preprint arXiv:2301.01902*.

Workshop II (林鍵鋒 清大資工四)

Week 14 (12/12)

內容分析與文字探勘(7): Text mining- LDA for topic modeling

28. Hung M, Lauren E, Hon ES, Birmingham WC, Xu J, Su S, Hon SD, Park J, Dang P, Lipsky MS. Social Network Analysis of COVID-19 Sentiments: Application of Artificial Intelligence *J Med Internet Res* 2020;22(8):e22590
29. de Melo T, & Figueiredo, C. M. S. (2021). Comparing News Articles and Tweets About COVID-19 in Brazil: Sentiment Analysis and Topic Modeling Approach. *JMIR Public Health Surveill*, *7*(2): e24585. doi: 10.2196/24585
30. Zhao, Y., Zhang, J., & Wu, M. (2019). Finding Users' Voice on Social Media: An Investigation of Online Support Groups for Autism-Affected Users on Facebook. *International Journal of Environmental Research and Public Health*, *16*(23), 4804.

Week 15 (12/19)

內容分析與文字探勘(8): Text mining- Sentiment analysis

31. Wrycza, S., & Maślankowski, J. (2020). Social Media Users' Opinions on Remote Work during the COVID-19 Pandemic. Thematic and Sentiment Analysis. *Information Systems Management*, 1-10.
32. Iglesias-Sanchez, P. P., Vaccaro Witt, G. F., Cabrera, F. E., & Jambrino-Maldonado, C. (2020). The Contagion of Sentiments during the COVID-19 Pandemic Crisis: The Case

of Isolation in Spain. *Int J Environ Res Public Health*, 17(16).

doi:10.3390/ijerph17165918

33. Chang, Y. (2019). Spectators' emotional responses in tweets during the Super Bowl 50 game. *Sport Management Review*, 22(3), 348-362.

Week 16 (12/26)

Final Project Presentation

評量配置

1. Attendance and participation 20%
2. Select 3 articles from the above class reading (self-selected articles are also welcome!) and conduct Paper Presentations 45 %
 - * Will discuss article selections on the second week
 - * Please turn in your PPT by Sunday midnight before your presentations
 - * Each presentation is 40 minutes, including PPT presentation and activities/leading discussion)
3. Final team project 35%